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THE MATHEMATICS CLUB OF GOUCHER COLLEGE, Baltimore, Maryland.

[1918, 357–358.]

During the year 1918–19, Professor Florence P. Lewis, who has heretofore had charge of the Mathematics Club at Goucher, was Exchange Professor at Wellesley College and Misses Margaret Amig '19 and Marguerite Lehr '19 acted as program committee. Below is given a complete list of the programs given during the year.

December 16, 1918: "Report of the summer meetings of the Mathematical Association of America and the American Mathematical Society" by Professor Clara E. Smith, Exchange Professor from Wellesley College.
January 6, 1919: "Report of a meeting of the New England Association of Teachers of Mathematics" by Professor Florence P. Lewis.
January 20: "Map-making" by Marie Whelan '18.
February 3: "Empirical equations" by Professor Clara L. Bacon.
February 19: "Paper folding" by Margaret Amig '19.
March 5: "Persons and anecdotes in mathematics" by Ethel Carrol '20.
March 17: "History of the squaring of the circle" by Loretta Whelan '20; "Simple Hints on plotting graphs" by Varina Davis '20; "Magic squares" by Deldee Groff '20.
April 14: "Russian peasant method of counting" by Eleanor Norris '20; "The planimeter" by Louise Ellery '20 and Mary Brower '20.
May 5: "The golden mean" by Jean Burke '20; "Zeno's paradoxes" by Ethel Fox '19.
May 13: Picnic.

PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL AND OTTO DUNKEL.

Send all communications about Problems to B. F. FINKEL, Springfield, Mo.

NOTE ON THE NUMBER OF SOLUTIONS OF LINEAR INDETERMINATE EQUATIONS.

BY D. N. LEHMER, University of California.

The solution of problem 2700 on page 215 of the May issue of the MONTHLY suggests the question as to whether a process may be found for obtaining, at least approximately, the number of solutions of an indeterminate equation in several variables. In the *Proceedings of the National Academy of Sciences*, April, 1919, I have given a method for getting, by a simple and direct process, the general form of the solution of any linear indeterminate equation in any number of variables. Such equations have been solved by Jacobi (*Werke*, Vol. 6, p. 355) but his process does not lead to the general form directly.

One finds for the equation $6w + 4x + y = 875$, which is the one treated in the Artemas Martin problem, the following general solution:

$$x = X - Y,$$
$$y = 875 - 4X - 2Y,$$
$$w = Y;$$

which give, since $w + x + y + z = 250$,

$$z = 3X + 2Y - 625.$$

All values of x, y, z, w, may be obtained from these by assigning integral values to X and Y. In order that x, y, z, w, shall be positive certain restrictions must be put on the values of X and Y. These restrictions are most easily understood when the pairs (X, Y) are taken as the coördinates of a point in the plane. It thus appears that the points (X, Y) available for our problem must lie in or on the boundaries of a quadrilateral enclosed by the four lines: $Y = 0$, $X - Y = 0$, $875 - 4X - 2Y = 0$, $3X + 2Y - 625 = 0$. The number of points with integer coördinates in this region will be approximately equal to the area of the quadrilateral which is found to be 2930. If Mr. Uhler's enumeration is correct this result is in error by 36. The actual number might be obtained by counting the number of lattice points in this quadrilateral.

The method applies as easily to problems involving a greater number of variables. Instead of areas one will have to consider volumes in space of three or more dimensions.

PROBLEMS FOR SOLUTION.

2784. Proposed by T. H. GRONWALL, New York City.

Show that all solutions in integers of $y^2 = 1 + x + x^2 + x^3 + x^4$ are given by

$$\begin{array}{llll} x = & -1, & 0, & 3; \\ y = & \pm 1, & \pm 1, & \pm 11. \end{array}$$

2785. Proposed by W. H. ECHOLS, University of Virginia.

If on the sides, as bases, of any closed plane polygon, there be constructed similar triangles similarly placed, all outward or all inward, then the centroid of the vertices of these triangles coincides with the centroid of the corners of the polygon.

2786. Proposed by R. A. JOHNSON, Hamline University.

At what angle should the face of a golf club (driver) be laid back, in order to secure the maximum distance of flight? Show that, under certain assumptions, the angle should be 15°.

2787. Proposed by WARREN WEAVER, University of Wisconsin.

In the gambling game known as "craps," two dice are thrown. The one throwing the dice makes a bet which is covered by an equal amount by one or more players opposing him. If he throws on the first throw a sum of seven or eleven he wins at once; if he throws a sum of two, three, or twelve he loses at once; if he throws any other sum he continues throwing until he either duplicates his original sum, and wins, or throws a sum of seven and loses. Show that the probability that the one who is to throw the dice will win is 0.49847, so that the game would be very nearly fair if one person were to throw the dice continuously instead of changing about, as is actually done.

Note.—Compare the article on "Probabilities in the game of 'Shooting Craps'" published elsewhere in this issue of the MONTHLY.—Editor.